The Time to Plan for Your Future Electric Fleet? Now.

By Mike Usen, DKS Associates

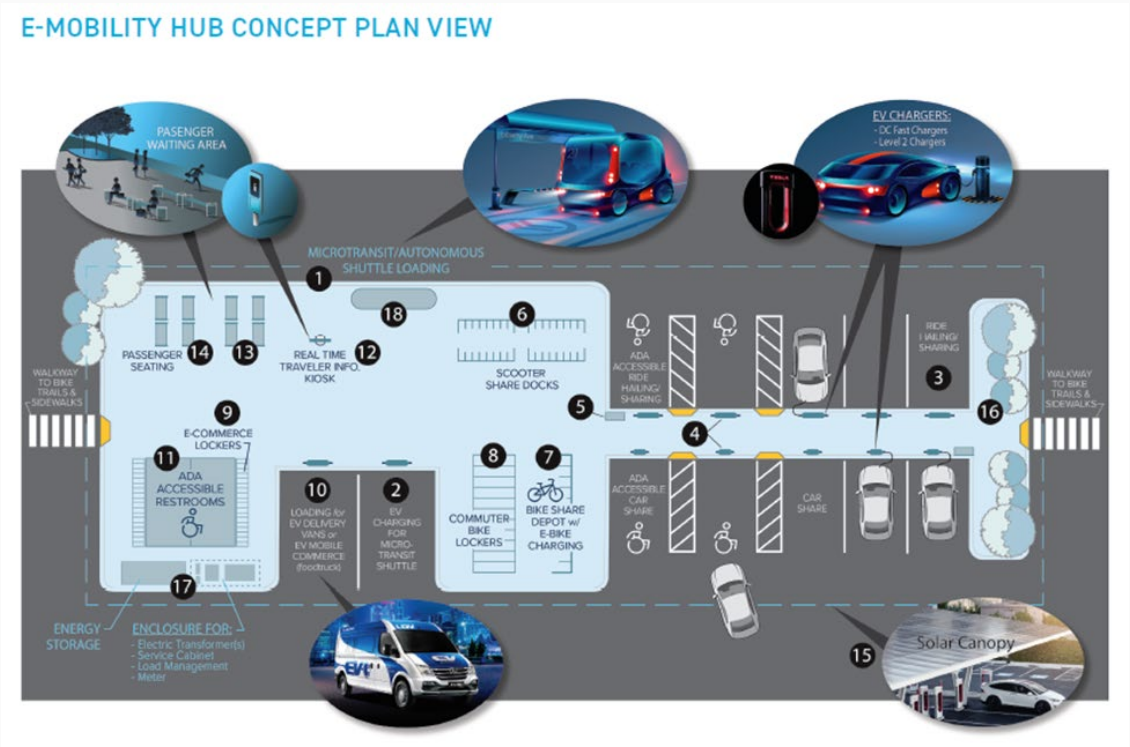
The transportation industry is in the early stages of a radical re-invention that will impact all aspects of mobility—from how people and goods will move to how vehicles will be controlled and fueled. In a little over a decade, the West Coast states of California, Oregon, and Washington will no longer permit the sale of new internal combustion-powered light-duty vehicles, and today's norms of liquid-fueled vehicles operated manually by human drivers will be in the rear-view mirror. Our near-term mobility future will be dominated by automated, digitally connected, electrically powered vehicles operated not just on roads, but in the air above our homes and workplaces too.

Electrification of transportation is still in its infancy, as commercially mass-produced EVs have only been available for a decade and EVs currently constitute just a small fraction of vehicles on the road. Last year, only 5% of the new cars sold in the United States were electric. While this may seem tiny, it was twice the percentage sold in 2020—and it's likely that EV sales will accelerate exponentially in the years to come. That's why so many smart public and private sector fleet managers are already engaged in preparing for mobility's electric, connected, autonomous future. They recognize that the disruptive phase the transportation industry is currently experiencing requires continuous and ongoing planning, informed by evolving technological and economic trends.

Our transportation system's radical re-invention will include the phase-out of liquid-fueled vehicles as use of electric vehicles rapidly increases.

Future-proofing your fleet is easier than you think.

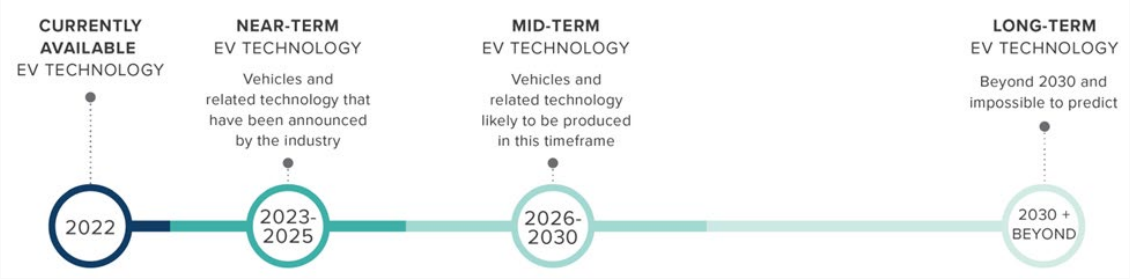
In 2020, King County, Washington, adopted an ordinance which codified its vehicle electrification targets and the installation of new charging infrastructure. The 2020 Climate Action Plan, adopted by the county's commission in 2021, incorporated these targets to reduce greenhouse gas emissions generated by county operations. This plan and the ordinance call for the county to replace half of the city's light-duty fleet vehicles with EVs by 2025 and to reach a complete light-duty electric fleet by 2030. For medium and heavy-duty vehicles, the electrification targets are 50% electrification by 2028 and 2038 respectively, and full electrification of medium-duty by 2033 and heavy-duty by 2043. The county hired DKS to develop its strategy to define recommendations for how and when to replace existing gasoline-powered fleet vehicles with electric vehicles and guide future charger deployment over the next 5 to 10 years. The strategy focuses on light-duty fleet vehicles assigned to multiple facilities across the sprawling county, ranging from large downtown garages to jails to suburban office parks.



An e-mobility hub incorporates electric vehicle charging and renewable energy into a place of connectivity where different modes of travel are supported.

On this project and for many others, we found that most light-duty fleet vehicles can be replaced by available or soon-to-be-available EVs, models which include sedans, SUVs, and pickup trucks. Another common finding is that the typical municipal fleet vehicle drives less than 25 miles per day, a small fraction of the 250+ mile range of most current EVs. With many fleet vehicles similarly underutilized, it often makes no sense environmentally to replace them. For example, since 16% of the City of Bellevue, Washington's fleet was driven less than 10 miles per day, we recommended that the city not replace these vehicles and avoid the need to add chargers to support them once electrified.

Going forward, we know that vehicle and charging technology will continue to change rapidly. Equally challenging for planning charging infrastructure deployment, the pace of change will likely accelerate.



Change is coming faster than you think.

As transportation quickly evolves, there are several sectors and trends worth tracking when planning fleet electrification:

- **The Regulatory Environment.** In 2020, California's governor Gavin Newsom signed an executive order requiring all new cars and passenger trucks sold in California to be zero-emission vehicles by 2035, and all medium and heavy-duty vehicles sold to be zero-emission the following decade. Other states and countries have followed suit, and others are likely to announce comparable targets soon. The automotive and energy industries are already responding by announcing new plans, investments, products, and incentives.
- **Funding and Tax Incentives.** The $1 trillion infrastructure package passed by Congress in 2021 includes multiple provisions for transportation electrification efforts, including $5 billion for states to deploy EV charging infrastructure; $2.5 billion to be used for charging and refueling infrastructure grants and an extension of the federal tax credit of $7,500 for newly purchased all-electric vehicles with US-manufactured components. The infrastructure package also extends the federal tax credit of $7,500 for newly purchased all-electric vehicles with US-manufactured components. EV battery technology is expected to continue to improve, increasing energy density along with creating a lower cost per kWh.

- **New Vehicle Choices.** One of the main challenges to fleet electrification is lack of suitable electric vehicles. Currently, there is a limited supply of all classes of electric vehicles, especially medium and heavy-duty EVs, and those that are available are often exceedingly expensive for municipal fleets to consider. In addition to the general market availability, multiple vehicle manufacturers are facing issues related to global supply chain constraints, as well as skyrocketing demand coupled with limited production
  capacity.
- Fortunately, many legacy automotive manufacturers are developing multiple electric models, and expect to start delivering these vehicles in 2023, following the wildly successful launch of Ford's F-150 Lighting truck. In addition, the new companies entering the EV market, including Rivian, Canoo, Lordstown Motors, ELMS, and others, are building vehicles specifically for fleet use. These offerings promise to make EVs very competitive compared to conventional cars in the next 2 to 3 years. Increased production is expected to lower costs, with some EVs

reaching price parity with engine-powered vehicles as early as the mid-2020s—that is if current supply chain woes abate.

- **Better Batteries.** In 2011, the original Nissan Leaf had a maximum range of only 75 miles, inflicting early EV adopters with the scourge of "range anxiety." Yet improvements in battery technology have improved the range that of EVs, and today's Nissan Leaf, powered by a more efficient and larger capacity battery, has a range of over 200 miles. Newer EV models average closer to 300 miles of range. Battery technology is expected to continue to improve, increasing energy density along with creating a lower cost per kWh. There is also a strong likelihood that existing battery technologies will be disrupted by a technological breakthrough, the result of billions of dollars in venture capital investments funding innovation around the globe. Examples include solid-state batteries and a new type of battery technology with Spatial Atom Layer Deposition (Sald) that could allow future electric vehicles to cover 600 or even 1,200 miles per charge. Tesla's 4680 cell batteries will be six times more powerful and increase its vehicles' range by 16 percent, and Toyota and numerous startups are developing solid-state battery technology intended to charge a vehicle in just 10 minutes.
- **Project Timeframes:** Electrifying a fleet--even a small fleet—does not happen overnight. It takes time to procure consultants, analyze fleet data, evaluate facilities for charger installation, coordinate with electrical utilities for power upgrades, and procure and install chargers. Depending on numerous variables, this process typically takes 1-3 years, by which time far more light, medium, and heavy-duty EV models will be available for delivery. Fleets without well-planned charging infrastructure in place will be left with no cost-effective way to charge. The infrastructure package passed in 2021 by Congress includes $5 billion for states to deploy EV charging infrastructure.

It is often said that the best way to predict the future is to build it. A solid and thoughtful fleet electrification plan is the first step towards building the resilient, sustainable, low-emission future for your organization and your community.

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